

[What is claimed is]

[Claim 1] A silica glass crucible used for pulling silicon single crystal, wherein at least an outer surface of a wall part of the crucible is covered with fine grooves having a length of less than  $200\ \mu\text{m}$ , a width of less than  $30\ \mu\text{m}$  and a depth of from more than  $3\ \mu\text{m}$  to less than  $30\ \mu\text{m}$ .

[Claim 2] The silica glass crucible according to Claim 1, wherein the fine grooves exist on more than 10 % of the outer surface of the crucible.

[Claim 3] The silica glass crucible according to Claim 1, wherein a sliding frictional coefficient of the outer surface of the crucible to a carbon at 1500 degree C is more than 0.6.

[Claim 4] The silica glass crucible according to Claim 1, wherein the outer surface of the crucible is covered with the fine grooves by carrying out a sand-blast treatment and a hydrofluoric acid etching on the outer surface.

[Claim 5] The silica glass crucible according to Claim 1, wherein the number of projections having a height of 0.1 mm or more is an average of less than  $5 / \text{mm}^2$  per unit area on the outer surface of the crucible.

[Claim 6] A silica glass crucible used for pulling silicon single crystal, wherein at least an outer surface of a wall part of the crucible is covered with fine grooves having a length of less than  $200\ \mu\text{m}$ , a width of less than  $30\ \mu\text{m}$  and a depth of from more than  $3\ \mu\text{m}$  to less than  $30\ \mu\text{m}$ , and the fine grooves exist on more than 10 % of the outer surface of the crucible, and

a sliding frictional coefficient of the outer surface of the crucible to a carbon at 1500 degree C is more than 0.6.

[Claim 7] A silica glass crucible used for pulling silicon single crystal, wherein at least an outer surface of a wall part of the crucible is covered with fine grooves having a length of less than  $200\ \mu\text{m}$ , a width of less than  $30\ \mu\text{m}$  and a depth of from more than  $3\ \mu\text{m}$  to less than  $30\ \mu\text{m}$ , and the fine grooves exist on more than 10 % of the outer surface of the crucible, and

a sliding frictional coefficient of the outer surface of the crucible to a carbon at 1500 degree C is more than 0.6, and

the number of projections having a height of 0.1 mm or more is an average of less than  $5 / \text{mm}^2$  per unit area on the outer surface of the crucible.

[Claim 8] A process for forming fine grooves on the surface of a wall part of silica glass crucible used for pulling silicon single crystal, comprising carrying out a sand-blast treatment and a hydrofluoric acid etching on the said surface.

[Claim 9] A process for forming fine grooves according to Claim 8, wherein fine grooves have a length of less than  $200\ \mu\text{m}$ , a width of less than  $30\ \mu\text{m}$  and a depth of from more than  $3\ \mu\text{m}$  to less than  $30\ \mu\text{m}$ .

[Claim 10] A process for forming fine grooves according to Claim 8, wherein the sand-blast treatment is the polishing method by spraying the hard particles having the higher hardness than that of the silica glass, with high pressure gas.

[Claim 11] A process for forming fine grooves according to Claim 10, wherein the hard particles are the crystalline quartz particles.